Atherosclerosis

What is Atherosclerosis?

Atherosclerosis (ath-er-o-skle-RO-sis) is the hardening and narrowing of the arteries. It is caused by the slow buildup of plaque (plak) on the inside of walls of the arteries. Arteries are blood vessels that carry oxygen-rich blood from the heart to other parts of the body.

Plaque is made up of fat, cholesterol, calcium, and other substances found in your blood. As it grows, the buildup of plaque narrows the inside of the artery and, in time, may restrict blood flow. Plaque can be:

- Hard and stable, or
- Soft and unstable.

Hard plaque causes artery walls to thicken and harden. Soft plaque is more likely to break apart from the walls and enter the bloodstream. This can cause a blood clot that can partially or totally block the flow of blood in the artery. When this happens, the organ supplied by the blocked artery starves for blood and oxygen. The organ's cells may either die or suffer severe damage.

Atherosclerosis is a slow, progressive disease that may start in childhood. It can affect the arteries of the brain, heart, kidneys, and the arms and legs. As plaque builds up, it can cause serious diseases and complications. These include:

- Coronary artery disease
  - Angina
  - Heart attack
  - Sudden death
- Cerebrovascular disease
  - Stroke
  - Transient ischemic attack (TIA) or "mini strokes
- Peripheral arterial disease

Diseases caused by atherosclerosis are the leading cause of illness and death in the U.S.

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What Makes Atherosclerosis More Likely?

While scientists do not know the exact cause, they do know that certain conditions increase your chance of developing atherosclerosis. They are called risk factors. Your chance of having atherosclerosis increases with the number of risk factors you have. You can control some risk factors and others you cannot.

Risk factors that you cannot do anything about are:

- Age. As you get older, your risk increases:
  - In men, risk increases after age 45
  - In women, risk increases after age 55.
- Family history of early heart disease. Your risk for atherosclerosis is greater if:
  - Your father or brother was diagnosed with heart disease before age 55
  - Your mother or sister was diagnosed with heart disease before age 65.

Risk factors that you can do something about include:

- High blood cholesterol
- High blood pressure
- Cigarette/tobacco smoking
- Diabetes
- Obesity
- Lack of physical activity.

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In all adults aged 20 years or older, a fasting lipoprotein profile (total cholesterol, LDL cholesterol, high density lipoprotein (HDL) cholesterol, and triglyceride) should be obtained once every 5 years. If the testing opportunity is nonfasting, only the values for total cholesterol and HDL cholesterol will be usable. In such a case, if total cholesterol is ≥200 mg/dL or HDL is <40 mg/dL, a followup lipoprotein profile is needed for appropriate management based on LDL. The relationship between LDL cholesterol levels and CHD risk is continuous over a broad range of LDL levels from low to high. Therefore, ATP III adopts the classification of LDL cholesterol levels shown in Table 2, which also shows the classification of total and HDL cholesterol levels.

Table 2. ATP III Classification of LDL, Total, and HDL Cholesterol (mg/dL)

LDL Cholesterol	
<100	Optimal
100-129	Near optimal/above optimal
130-159	Borderline high
160-189	High
≥190	Very high
Total Cholesterol	
<200	Desirable
200-239	Borderline high
≥240	High
HDL Cholesterol	
<40	Low
≥60	High

Risk determinants in addition to LDL-cholesterol include the presence or absence of CHD, other clinical forms of atherosclerotic disease, and the major risk factors other than LDL (see Table 3). (LDL is not counted among the risk factors in Table 3 because the purpose of counting those risk factors is to modify the treatment of LDL.) Based on these other risk determinants, ATP III identifies three categories of risk that modify the goals and modalities of LDL-lowering therapy. Table 4 defines these categories and shows corresponding LDL-cholesterol goals.

Table 3. Major Risk Factors (Exclusive of LDL Cholesterol) That Modify LDL Goals*

- Cigarette smoking
- Hypertension (BP ≥140/90 mmHg or on antihypertensive medication)
- Low HDL cholesterol (<40 mg/dL)†
- Family history of premature CHD (CHD in male first degree relative <55 years; CHD in female first degree relative <65 years)
- Age (men ≥45 years; women ≥55 years)*

* *In ATP III, diabetes is regarded as a CHD risk equivalent.*

† *HDL cholesterol ≥60 mg/dL counts as a "negative" risk factor; its presence removes one risk factor from the total count.*